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ABSTRACT

This document reports on the results of tests of nutrition knowledge given to a random selection of Illinois students in the fourth, eighth, and eleventh grades. The assessment included questions measuring student knowledge of nutrients, the role of nutrients in the body, food handling principles, the relationship between food intake and the psychological aspects of food, and the importance of a balanced diet. An analysis is presented of the test results, and recommendations are made for improving the nutrition curriculum in the schools. Sample questions designed to reveal student attitudes toward nutrition are presented for each age group with comments on the responses. Concepts such as food groups, obesity, and the relationship between appetite and hunger were troublesome for the fourth graders and some eighth graders. By the eleventh grade, a definite improvement in the ability to identify the nutrient contribution of each food group was evident. Test results indicated that the study of nutrition should be expanded at all levels, and taught with a multidisciplinary approach. (JD)

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1980
Nutrition
Report

Illinois
State Board of
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IIEP

ILLINOIS INVENTORY OF EDUCATIONAL PROGRESS

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FOREWORD

This report has been prepared by the Program Evaluation and Assessment Section of the Illinois State Board of Education for the purpose of providing information on student knowledge in the area of nutrition.

Donald G. Gill

Donald G. Gill
State Superintendent of Education

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SECTION I - INTRODUCTION TO THE 1980 IIEP NUTRITION REPORT

Nutrition Education and Training in Illinois

In 1977, Section 19 of Public Law 95-166, the National School Lunch Act and Child Nutrition Amendment, was enacted by Congress to authorize each state educational agency to formulate and carry out a Nutrition Education and Training (NET) Program. One of the program objectives for the NET program in Illinois concerns teaching students about the nutritional value of foods and the relationship between food and human health. Participation in NET sponsored activities should give students the opportunity to improve their knowledge and attitudes towards food with the hope that they will make wiser food choices. The NET program also emphasizes the training of teachers and food service personnel and development of sound nutrition education materials utilizing a multidisciplinary approach. Integration of classroom and cafeteria activities will hopefully enhance the ability of students to make wise food choices.

The Nutrition Education and Training Program in Illinois includes four basic goals which reflect the federally developed goals. These are: 1) facilitating a nutrition education process which permits Illinois children to make informed food choices during their formative years; 2) enhancing the ability of teachers to integrate sound nutrition information into the curriculum utilizing innovative teaching techniques at each grade level; 3) delineating and strengthening the role of the school food service personnel in the food service and nutrition education process; and 4) identifying, compiling, evaluating, developing, and providing nutrition education curriculum materials to educational institutions.

In addition to the four goals stated above, seven concepts were developed to provide guidance as schools incorporated more nutrition education into the existing curriculum. These seven concepts are:

Physiological Facts - Nutrition is the way body uses food. We eat food to live, to grow, to keep healthy and well, and to get energy for work and play.

Nutrients - Food is made up of different nutrients that work together and interact with body chemicals to serve the needs of the body. Many kinds and combinations of food can provide a nutritionally adequate diet.

Food Handling - The way food is handled influences the amounts of nutrients in food, its safety, quality, appearance, taste, acceptability and cost.

Life Cycle - All persons throughout life have need for the same nutrients, but in varying amounts. The amount of nutrients needed is influenced by age, sex, activity and state of health.

Social/Psychological Aspects of Food - Food can be chosen to fulfill physiological needs and at the same time satisfy social, cultural, and psychological wants.

Food Technology - The nutrients, singly and in combinations of chemical substances simulating natural foods, are available in the market; these may vary widely in usefulness, safety of use and economy.

Nutrition and Society - Food plays an important role in the physical and psychological health of the society or a nation just as it does for the individual and family.

A portion of the NET personnel funds awarded to the State Board of Education was used by the Program Evaluation and Assessment Section of the agency to assess student knowledge of nutrition at fourth, eighth, and eleventh grade levels as part of the statewide assessment program, the Illinois Inventory of Educational Progress (IIEP). This report combines a curricular analysis which generalizes about the objectives which were tested with an indepth look at each item.

The analyses of the Illinois student results were prepared by a panel of external reviewers: (1) Rosemary Harms, home economics teacher, Bloomington Junior High School; (2) Susan Funkhouser, Home Economist, Chair of the Illinois Area Offices for the St. Louis Dairy Council; (3) Janet Schloeman, elementary teacher, Nutritional Awareness Project, Belleville District 118; (4) Janet Hennecke, Assistant Extension Advisor, Food and Nutrition Education program; (5) Dr. Wynette Bernard, Home Economist, Assistant Professor, University of Illinois, former Director of Consumer Affairs - Prospect Food Company; and (6) Sister Ritamary Brown, Director of Food and Nutrition Services, St. John's Hospital, Springfield, Illinois.

Purpose and Goals of the IIEP

The purpose of the IIEP is to assess what Illinois students know and can do in certain subject matter areas and to provide that information to educational decision makers.

The goals of the IIEP are:

1) To make available reliable, valid, and relevant data on the educational achievement of Illinois students; and

2) To identify any trends (growth, stability, or decline) in educational achievement which occur over time.

Objectives and Items

Objectives for the nutrition portion of the state assessment were written by the panel of nutritionists previously identified.

Items were obtained from a variety of sources including Pennsylvania State University, the American Dairy Council and Belleville District 118, Belleville, Illinois. It should be noted that there was not a large pool of technically sound items readily available in the content area of nutrition at the time the test was constructed.

External review comments follow individual item results. These comments, by the panel of reviewers, are not only provided for data interpretation but also as a critique of items. If local district staff wish to use certain portions of the assessment, the suggestions for improvement may be helpful.

Student Sampling Model

A two-stage random sampling model was used to select students for participation. In the first stage, a random sample of approximately 360 schools throughout the state was drawn. Then a random sample of the students within these schools was drawn from the lists of eligible students submitted by the school. The final sample included about 7,200 Illinois students at the fourth, eighth, and eleventh grades. The sample selected is, therefore, representative of students approaching the end of primary, elementary, and secondary levels of education.

SECTION II - CURRICULAR ANALYSES

Overview Analysis of the Nutrition Results

Introduction

The 1980 Illinois Inventory of Educational Progress (IIEP) included the testing of fourth, eighth and eleventh grade students on nutrition. The assessment included questions measuring student knowledge of nutrients, the role of nutrients in the body, food handling principles, the relationship of food intake and the psychological aspects of food, and the importance of eating a balanced diet. The IIEP attempted to assess factual knowledge as well as the application of this knowledge.

A group of objectives was developed by the panel of external reviewers and the IIEP items were then keyed to them. Some items assess more than one objective, while other objectives (7-8) were not assessed at this time. In the item analyses which follow the curricular reports, the objective numbers are noted.

Nutrition Objectives

In order for students to reach the ultimate goal of eating a nutritionally adequate diet, the student needs to be able to demonstrate that he/she:

1. recognizes that nutrition is the way the body uses food to live, grow and keep healthy. More specifically, he/she recognizes the relationship between good nutrition and feeling well and that improper dietary intake may result in health problems.

2. recognizes and selects a nutritionally adequate diet. This involves being able to classify food according to its nutrient contribution into four food groups and others, as well as recognizing number and size of serving needed. The student also should be aware of the varying nutritional needs according to age, sex, activity level and state of health.

3. identifies essential nutrients, sources, functions, interrelationships. In order to accomplish this, the student needs to understand that a variety of foods is necessary to obtain the essential nutrients.

4. recognizes that the way food is handled influences the amount of nutrients in food, its safety, quality, appearance, taste, acceptability and cost.

5. recognizes the relationship of food intake and activity level to body weight, and understands caloric value of foods.

6. recognizes that foods can be chosen to fulfill physiological, cultural, social, and psychological needs.

7. recognizes that nutrients, singly or in a combination of chemical substances simulating natural foods, are widely available in the market. These may vary in usefulness, safety of use, and economy.

8. recognizes that a wide variety of aids, such as nutritional labeling, booklets, and handbooks, are available to make food choices. In addition, the student recognizes the influence of advertising on food choices.

In interpreting these test results, it must be kept in mind that the actual measure of knowledge acquired through school instruction is difficult to ascertain. Since the approach to good nutrition practices varies widely among individual households, it is difficult to perceive what the child learned in school and what he/she learned at home and elsewhere.

The test results indicate that fourth graders appear to understand the concept that good nutrition means eating the right amount of food from each of the four food groups, and, that doing this will enable the body to live, grow and keep healthy. However, they are not aware of the proper number of foods to choose from each food group. The review panel believes that this is an important concept which needs to be learned as early as possible. Only one-third of the fourth graders knew the correct definition of "nutrient."

Although three-fourths of the fourth graders recognized the relationship between sticky sweets and tooth decay, there did not seem to be a complete understanding of the relationship between other food types and tooth decay. Perhaps the concept of how nutrition affects dental caries should be stressed more at the fourth grade level and included in the eighth and eleventh grade curricula as well.

All fourth graders do not have a thorough understanding of the importance of breakfast. Over a third of the students felt they could make up at lunch time for nutrients missed at breakfast.

Fourth graders show some misconceptions about the relationship between appetite and hunger. A significant number of students have the misconception that the more one eats, the healthier he or she is. This coupled with a lack of understanding regarding the concept of calorie intake and output and subsequent weight control could contribute to what the review panel believes is the leading nutritional problem today - obesity with its accompanying physical problems.

Students at the eighth and eleventh grade levels possess a good awareness of proper food handling and cooking techniques. Many students were able to identify foods which are easily contaminated by bacteria. This finding is viewed as a positive step by the panel, as children at this age are beginning to participate more actively in food preparation.

A large number of eighth grade students displayed an ability to classify specific foods into their food groups, but they may need more education concerning combination foods and fast-food items. Eleventh graders tended to show an inability to properly classify combination foods in terms of the four food groups.

A definite improvement in the ability to identify the nutrient contribution of each food group was evident from the eighth to the eleventh grade students tested. Many students realized that an individual needs to eat a variety of foods to obtain the needed nutrients. Only half of the eleventh graders realized that the nutrient supplying energy is a carbohydrate, with 30% believing iron to be the nutrient source of energy.

With respect to the relationship of nutrients to body weight, only half of the eighth and eleventh grade students recognized that being overweight is caused by many factors, including nutrition, heredity and weight as a child.

Almost all eleventh graders knew that it is easier to digest food when eating slowly rather than eating fast or when upset. The panel of external reviewers suggested that this finding could suggest some understanding of the psychological and social aspects of food.

Several concepts were not tested. The review panel sees a need for assessment of the following important objectives:

A. The recognition that foods can be chosen to fulfill physiological as well as cultural, social and psychological needs.

B. The recognition that nutrients, singly or in a combination of chemical substances simulating natural foods, are widely available in the market. These foods may vary widely in usefulness, safety, and economy.

C. The recognition that a wide variety of aids, such as nutritional labeling, booklets and handbooks, are available to make food choices.

Toward the Future

According to these external reviewers, the results of the 1980 IIEP indicate that the study of nutrition at all levels could be expanded and taught with an intercurricular approach. Responsible nutrition education could help people recognize and select a nutritionally adequate diet with the hope that this knowledge will be applied by eating a nutritionally adequate diet.

The panel suggests that students need to acquire a realistic knowledge of nutrition that is applicable to their lifestyle. An extremely important concept to learn is that the Recommended Daily Dietary Allowance is obtainable from the four food groups through a variety of eating styles. The reviewers also recognize that a traditional and regimented three-meal approach may conflict with varying daily schedules and today's lifestyles. The concept of nutritious snacks needs to be developed so that an active population may learn that there need not be a conflict between "eating on the run" and obtaining an adequate diet.

Panelists believe that hunger and appetite should be viewed within the context of the cultural, psychological and social aspects of eating. They feel that parents and teachers need to be aware of the strong and persistent influence media has on the dietary habits of students. The panel believes that children need to be aware that they will be subjected to the barrage of a billion-dollar advertising campaign and must learn to make food choices based upon sound nutritional principles. Chemically defined foods are becoming more and more available, and the space age concept of obtaining all the necessary nutrients from a pill needs to be balanced against the social, psychological and physiological values of eating foods in their natural state.

According to the panel, the most important goal of nutrition education is that the student selects and eats a nutritionally adequate diet. Although this is difficult to assess, it is hoped that knowledge and awareness of basic nutritional concepts will result in this end.

Curricular Analysis of the Fourth Grade Results

Test Results

The test results tend to indicate that most fourth graders recognize that nutrition is the way the body uses food to live, grow, and keep healthy (Objective 1). Fourth graders, however, do not have a thorough understanding of breakfast. Twenty-four percent of the fourth graders thought that a breakfast high in sugar would provide energy for a long period of time. Panel members feel that this respose may have resulted from exposure to specific television advertisements. Thirty-seven percent also felt that if they skipped breakfast, they could make up the nutrients easily at lunch. Another 26% felt that the body would adjust to the nutrient deficiency. Three-fourths of the fourth graders recognized the relationship between sticky sweets and tooth decay. However, only one-third knew that other factors besides sugar consumption can affect the incidence of dental cavities.

In regard to selecting a nutritionally adequate diet (Objective 2), 64% of the fourth graders chose the "the Basic Four" as the proper guide to follow. However, about a third of the students tested felt that appetite was the determining factor. The panel feels that this high percentage may cause some concern because what a person is hungry for may not always be a wise choice nutritionally. More than half of the fourth graders were able to apply practical knowledge of the four food groups when asked to select a meal that would promote good nutrition. A large number of students were not familiar with the different kinds of food in each food group and were, therefore, unable to determine the food group that was absent from the menu selection. The panel feels that students at this grade level may also not be aware that it is beneficial to have each food group represented at a meal. There appeared to be some confusion when a combination food was entered as a choice. Only 28% recognized that an egg sandwich, orange, and milk represented a breakfast with foods from each food group. An additional reason for the low percentage could also have been that students did not recognize an egg sandwich as a common breakfast item.

There were no questions testing student knowledge of the proper number of servings needed every day from each food group. The external reviewers think that this is an important concept for fourth graders - a concept which should be included in future assessments.

Over half of the fourth grade students realize that nutrients are supplied through food, not by vitamin pills or calories (Objective 3). However, when asked to simply define "nutrients," only one-third of them could correctly do so. Twenty percent said that nutrients were really "body parts that grow and give you lots of strength." While only 40% of the students knew that fruits and vegetables were an important source of vitamins and minerals, the study of nutrients and the characteristics of each food group may not be a part of the curriculum at the fourth grade level. However, the panel feels that fourth graders should have a basic understanding of what a nutrient is.

Less than half (41%) of the fourth graders knew that those who have an increased activity level usually require a larger food intake than those who are less active (Objective 5). Nineteen percent of the students have the misconception that the more one eats, the healthier he or she is. One-third of the students thought that hunger is the signal that one needs more food. Hunger for a specific food does not mean the body needs more of that food. The panel pointed out that this misconception can set a pattern for childhood or adult obesity problems. Although many (49%) of the students recognized that the body stores extra calories in the form of fat, the majority demonstrated a lack of understanding of the concept of calorie intake and output.

Toward the Future

Although the results of the fourth grade nutrition test appear to indicate some knowledge about nutrition, the external reviewers believe that the test also reveals that more attention may need to be given to this subject in order for fourth grade students to have a better basic understanding of nutrition. Of the 20 test questions, 18 represented the first three objectives stated on the guidelines. According to the panel, these three

key objectives should have the most emphasis in nutrition education at the fourth grade level. Increased instruction time for fourth graders could be given on the Basic Four Food Groups so that students may be able to identify the foods characteristic of each group.

According to the panel, the subject of breakfast is an area where greater emphasis needs to be placed because of the lack of breakfast in the diets of many Americans. Fourth graders should be made aware of the importance of breakfast and the effects that failing to eat breakfast can have on the body. "Traditional" versus "nontraditional" breakfast foods should be presented to show the variety and interest that breakfast has to offer.

The review panel believes that if fourth grade students have a sound understanding of "the Basic Four," then the study of nutrients, their sources, and functions could be added to the curriculum, as well as teaching the effects of calorie intake and output. Course content, relating to Objective 4 on food safety and handling, would be of benefit to the fourth grade learner.

Curricular Analysis of the Eighth Grade Results

Test Results

The eighth grade nutrition test contained items on the meaning and implications of good vs. poor nutrition. In addition, emphasis was placed on the four recognized food groups, essential nutrients and their functions, food handling, body weight, and attitudes about nutrition education.

Many of the items were concerned with student ability to recognize and select a nutritionally adequate diet (Objective 2). This concept was further identifed by Objective 3, which tested the student ability to identify essential nutrients, their sources and functions.

Several items dealt with the relationship of nutrition to health, body weight, physiological needs and psychological wants (Objectives 1, 5, and 6).

Objectives 4 and 8 measured the consumer aspects of nutrition involving taste, appearance, cost, and handling.

In reviewing the eighth grade nutrition results on the IIEP, it is difficult to separate knowledge acquired through school instruction from the knowledge acquired through the home and media. As a result, caution must be used in interpreting the results.

In regard to Objective 1, 89% of the students knew that good nutrition means eating the right amount of food from each of the four food groups. For this age and grade level, the panel believes that student performance concerning Objective 1 is satisfactory.

The results from questions developed to assess Objective 2 indicated that most students have some knowledge of the four recognized food groups. When asked, most students were able to classify food items into the correct categories. However, student knowledge appeared to be of a general nature in that poultry and fish were easily identified with the meat group, but items such as eggs, dry beans, and peanut butter were thought to belong to another category. This fact is further exemplified by student inability to classify combination and fast-food items into the recognized food groups. Only 27% of the students were able to correctly identify items from a fast-food menu into recognized food groups.

Student results relating to Objective 3 appear to indicate that most students can identify the essential nutrients and the foods in which they are most commonly found. For example, 51% of the students identified breads and cereals as primary sources of carbohydrates. An even greater percentage of students (82%) identified the main source of calcium and its importance. Of all questions tested, the largest correct response (92% and 95%) were milk-related questions. The review panel suggests that these results may have been influenced by student exposure to media and parental influence.

With only two questions relating to physical activity and weight control, it is difficult to make generalizations based on student responses. Since longer life span may be expected for a weight-conscious society and since, according to the panel, obesity is a leading health problem with related physical and emotional problems, they think that this area needs to be emphasized in nutrition programs.

The three questions relating to food preparation and handling all received satisfactory response rates (83%, 68% and 51%). Such a response seems to indicate that students have a basic understanding in this area.

Although there were two questions which assessed Objective 6, it was once again difficult to draw any specific conclusions. However, the reviewers think that it is important for students to understand what influences their food choices so that they can make wise and responsibile food selection decisions.

Another significant area relates to the attitudes and opinions of students regarding nutrition education. The results indicate that students are rather interested in and concerned about good nutrition. The review panel believes that such a response could be interpreted as a positive one for the development of stronger nutritional programs within the schools.

Toward the Future

The external reviewers believe that the study of nutrition at all levels needs to be continued and expanded. There are many resources and opportunities that can be utilized for nutrition instruction. Schools can also foster the use of the community as an educational setting. Dieticians, nutritionists, school lunch personnel, government agencies, home extension personnel, and teachers can join in efforts to provide a more complete and unified nutrition education program.

The panelists are also of the opinion that nutrition education should begin at the parental-mother stage and continue through adult life. In addition, nutrition education should include both male and female populations. Early training in nutrition needs to be presented in a simple, interesting, and practical manner. They think that nutrition may also need to be taught not as an isolated unit, but with an interrelated approach. Panel members feel that since it cannot be assumed that students will make these links automatically, nutrition curriculum in schools needs to be planned to show the interrelation of learning.

Panel members feel that responsible nutrition education could help people not only to recognize and select a nutritionally adequate diet, but, most importantly, to eat a nutritionally adequate diet.

Most of the nutrition objectives which were tested showed positive results for eighth grade students. Some results indicate areas needing further attention. While a test of this type may give some indication of student knowledge of nutrition, it cannot provide a complete assessment.

Curricular Analysis of the Eleventh Grade Results

Test Results

The eleventh grade nutrition test contained test questions about the purpose of nutrition and its relationship to good health. Additional questions assessed student selection of an adequate diet, student knowledge of nutrients, food handling principles, the relationship of food intake, and psychological aspects of food (Objectives 1-6).

The majority of items dealt with the function of nutrients, food groups and recognizing a nutritionally adequate diet (Objectives 2 and 3). In addition, three items sought background information about student attitudes towards nutrition and nutrition education.

Overall, eleventh graders appeared to have a good understanding of the nutrition objectives tested.

Ninety-five percent of the students responded correctly to the one question related to Objective 1, which is that a student recognizes that nutrition is the way the body uses food to live, grow and keep healthy. This high percentage appears to indicate that students know the definition of good nutrition.

Objective 2 was concerned with recognizing a nutritionally adequate diet, classifying food into food groups, and the nutrient contribution of food groups. This objective received the greatest focus, with ten test items. Two test questions asked students in which food group eggs belong and which foods belong in the meat group. Half of the students knew that eggs belong in the meat group, which was an improvement from the eighth grade results. Only 40% answered correctly as to what foods are included in the meat group, with 50% giving animal protein as the answer. The panel feels that the lower correct response rate to these two questions could indicate a lack of knowledge about incomplete proteins.

Four test questions asked students to identify the nutrient contribution of each food group. Percentages of correct responses ranged from 70% to 90% indicating a good understanding of this area. In particular, students knew that calcium is provided by the milk group.

Three test questions related to identifying nutritious meals or snacks. Ninety-two percent were able to identify nutritious snacks. With respect to eating a balanced dinner, 97% recognized that milk was missing from the meal presented. This result indicates a good knowledge of the four food groups and particularly the need for milk. Yet, in a similarly styled question which asked what menu included foods from the four food groups, only 32% gave the correct answer. Since the correct answer included pizza, it seems apparent that students were unable to analyze combination foods. The answer chosen most frequently (58%) is actually a reasonable meal, and, therefore, the response still indicates a fairly good understanding in this area.

Objective 3, identification of the sources and functions of nutrients, also received considerable emphasis with nine test items. Two items related to the function of calcium with 85% and 93% of the students answering correctly. Again there seems to be a good knowledge of the function and need for calcium. Eighty-three percent of the students knew that iron is needed to help prevent fatigue and that it is especially important for females. Reviewers felt the increase in correct responses from the eighth grade may indicate this concept is stressed during this time period. The test item with the lowest correct response rate (50%) asked students which nutrient supplies energy. Although half of the students answered correctly with carbohydrates, 30% gave iron as the answer. Seventy-nine percent of the students were able to identify the major nutrients, and 93% knew that an individual needs to eat a variety of foods in order to get the needed nutrients. Overall, students seemed to have a good knowledge of this objective.

Three test questions were related to Objective 4, which assessed the recognition of the effect of food handling practices. Two of the questions concerned the handling of fruits and vegetables. There seemed to be some awareness of the importance of proper handling and cooking techniques with 84% to 85% of the students answering the two related items correctly. Seventy percent of the students were able to identify foods which are easily contaminated by bacteria. Review panel members believe that, overall, the high correct response percentages for items on food handling and safety were very encouraging since many students at this age level are beginning to help in food preparation.

Two test questions were related to Objective 5, concerning the relationship between food intake, activity level and body weight. This objective seems particularly relevant to this age level since high school students tend to be rather conscious of their weight. The first question asked which of three types of milk has fewer calories. Ninety-six percent of the students gave the correct response which was skim milk. This tends to show an awareness that different forms of foods have different caloric values. The question related to causes of overweight showed that 57% of the students recognized that heredity, weight as a child, and food intake can all affect body weight. Thirty-seven percent chose the answer that related calorie intake and activity level to body weight.

Two test questions were somewhat related to Objective 6, recognizing the psychological and social aspects of food. Ninety-six percent of the students understood that it is easier to digest food when you eat slowly, rather than eating fast or when you are upset. Also, 57% recognized that social and environmental factors may influence body weight.

Items to test Objectives 7, 8 and 9 were not available. However, external reviewers believe it is important for students to recognize the availability of chemical substances which vary in their usefulness, safety, and economy. Students also need to recognize the importance of being a well-educated consumer.

Finally, three questions provided background information about the students and were not related to any one objective. The first question asked students to compare the taste of nutritious foods to other foods. Fifty-seven percent felt they tasted about the same, 36% not as good, and 7% thought they tasted better. Since over a third thought they didn't taste as good, and most people tend to eat foods they like, it could become an important objective for teachers and parents to help students to try a variety of foods and possibly to develop a wider range of likes. The second question asked where student attitudes toward nutrition have been formed. Fifty-one percent said home, 27% their own thinking, 12% school and 40% each for friends and media. The third question asked how much nutrition education should be included in the school curriculum. Fifty percent thought it should be studied more, 42% thought it was studied enough, and 9% thought it should be studied less or not at all. The fact that 92% of the students were satisfied with current practices or wanted more nutrition education in the schools is encouraging to the panel in terms of indicating students' interest in and awareness of the importance of good nutrition.

Toward the Future

The results of the IIEP appear to indicate that eleventh graders in Illinois have a good knowledge of nutrition based on their responses to the test items. On 16 of the 22 items, three-fourths or more of the students responded correctly. On the remaining six items, about half of the students responded correctly. There was also a larger percentage of correct responses when comparing eighth and eleventh grade results. The panel members suggested that this may indicate that high school curricula have a greater emphasis on nutrition or that students have a higher degree of interest in nutrition and its application.

In the future, teachers may want to not only continue current education in nutrition, but expand it more to the application and utilization level. While the students tested were able to define and classify, many were unable to apply or analyze the basic knowledge to more complex situations. Since the panel believes the ultimate goal of nutrition education is to have people apply the principles to eating behaviors, they think that it is important to help students in this process. This may mean encouraging students to take a more active role in the planning, selection and preparation of food consumed.

SECTION III - ITEM ANALYSES

Fourth Grade Item Analyses

The following questions are concerned with student attitudes toward nutrition. The numbers to the left of the choices represent the percentages of students who chose each one. Reviewers' comments follow each item.

#119

Foods that are supposed to be good for you taste

23.8%	a.	better than other food.
28.2%	b.	not as good as other food.
47.7%	c.	about the same as other food.

Panelists feel that it is possible distractor "a" may have been chosen because students may think it is the most appropriate answer for a nutrition test. Teachers could provide food experiences that show fourth graders that nutritious foods can be fun to make and good tasting.

#120

My feelings concerning a balanced diet have been formed mostly through

45.1%	a.	my home (my parents and family).
8.3%	b.	my friends and others my own age.
9.9%	c.	school.
7.1%	d.	TV or other media.
28.3%	e.	my own thinking (independent of others).

According to reviewers, it seems that T.V. and other media may not have as great an impact as many people believe. Many mass media advertisements are geared to this age group, and it would be expected that there would be a greater percentage of response to this answer choice.

Although some fourth graders may actually prepare their own meals, their selection of food is usually determined by what is available in the home. A student may believe he or she is making an individual choice, but, in fact, some of the choices have been preselected by the parent or the school cafeteria.

The term "balanced diet" may be unfamiliar to some fourth graders. The question may have been more understandable if it had read, "My feelings concerning <u>what I eat</u> have been formed mostly through."

#121

You know that how well you eat can affect how well you feel. So who really has the final choice of what foods you eat?

26.5%	a.	It's my mother's job.
3.5%	b.	It's my grocer's job.
1.9%	c.	It's my teacher's job.
67.4%	d.	It's my job.

It is encouraging to see that more than two-thirds of the fourth graders say that they accept responsibility for their eating habits.

It is understandable that approximately one-fourth of the students chose response "a", since the mother is often the person who does the food buying and meal planning.

In the interest of diminishing the sex role stereotypes and due to the fact that some children live only with their father, this response would be better stated if it were changed to "It's my parent's job."

#122

Information about nutrition

5.3%	a.	should be studied less in the schools.
61.4%	b.	should be studied more in the schools.
22.4%	c.	is studied enough in schools.
10.2%	d.	is not important enough to be included as a special part of the school curriculum.

The following questions have a designated correct response which is underlined. In addition to the percentage of students responding to the correct answer and the reviewers' comments, the objective(s) which is assessed by the question is indicated.

#123 OBJECTIVE 3

Nutrients are really

	a.	ingredients which are all mixed together like soup or water.
	b.	meals with several choices like liver, ham, turkey, hamburger.
	c.	body parts that grow and give you lots of strength.
35%	d.	<u>something your body needs and finds in food.</u>
	e.	special foods you get from a health store.

One-third of the students recognized the definition, but to correctly answer this question the student did not need to give a technical definition, but merely be acquainted with the term.

#124 OBJECTIVES 1, 3

The nutrients needed for health and growth are

a. supplied by vitamin pills.
53% b. all available through food.
c. contained in calories.

More than half of the students chose the best response. Panel members suggest that this may indicate that students know that the best source for nutrients is food. The problem with the item is that nutrients can also be found in vitamins, and, therefore, there needs to be an emphasis on the "best" source.

#125 OBJECTIVES 1, 2

Select the one statement that is true about breakfast.

64% a. People who skip breakfast often do not get their required daily amount of nutrients later in the day.
b. People who eat breakfast snack more.
c. A breakfast high in sugar will provide energy for a long period of time.

This question assesses two nutritional objectives involving the importance of eating a balanced breakfast. It is significant because breakfast is often the most neglected meal according to the panel.

Two-thirds of the students realized that people are more apt to get their required daily nutrients if no meals are skipped. It appears most fourth graders know that breakfast is important. What may need to be stressed is the nutritive quality of the breakfast.

#126 OBJECTIVE 2

Which breakfast includes a food from each of the four food groups?

29% a. Egg sandwich, orange, milk
b. Orange juice, cereal, milk
c. Toast, milk, grapefruit

Fewer than three out of ten fourth graders answered this question correctly. This may have been caused, in part, by the fact that the student must know the four food groups, the foods found in each group, why eggs belong to the meat group, and be able to recognize combination foods (e.g., egg sandwich).

#127 OBJECTIVE 1

If children skip breakfast, they can

36% a. seldom perform at full efficiency in the morning.
b. make up the nutrients they missed when they eat lunch.
c. adjust their bodies accordingly.

Although question 127 indicates that students may know breakfast is important, panalists believe that the results on this question indicate that there may need to be more in-depth teaching on why breakfast is important.

#128 OBJECTIVE 3

Fruits and vegetables are important because

a. they are our best source of the B vitamins.
40% b. they are a source of essential vitamins and minerals.
c. they are an excellent protein source.

Since only 40% of the students recognized that fruits and vegetables are an important source of vitamins and minerals, reviewers think that there is a need for instruction on the four food groups and those nutrients characteristic of each group. Over one-third of the students incorrectly thought that fruits and vegetables were a good source of protein.

#129 OBJECTIVE 3

What is lean meat?

74% a. Meat with most of the fat removed
b. Meat made out of soy beans
c. Meat with lots of fat, bone and gristle

The results indicate that students know the definition of lean meat. Reviewers think that this elementary concept is more appropriate at a lower grade level.

#130 OBJECTIVE 1

The body needs energy to work and play. We get our energy from

a. air.
b. exercise.
74% c. food.

This question relates to a basic nutritional concept. Almost three-fourths of the fourth graders indicated that they have some knowledge about the concept that their body gets the energy it needs from the food they eat.

#131 OBJECTIVE 5

Some people need more food than others because they are

a. dieting.
41% b. more active.
c. hungrier.
d. healthier.

Fewer than half of the fourth graders indicated that they understood that those who have an increased activity level usually require a greater amount of food intake than those who are less active.

External reviewers think that a number of students appear to need instruction on the concept that just because an individual eats a lot does not mean that she/he will have a healthy body.

#132 OBJECTIVE 5

When the body takes in more calories than it needs

a. the extra calories are eliminated by the body.
49% b. the body stores the extra calories in the form of fat.
c. the body becomes more active.

This is an important concept to test at the fourth grade since, according to the review panel, obesity is a major health problem in our society today. Over 50% of the students do not understand the concept that when the body takes in more calories than it needs, the extra calories are stored as fat.

#133 OBJECTIVE 1

Frequent between-meal snacking on sticky sweets is related to tooth decay because

a. they are high in calories.
78% b. intense bacterial activity occurs when sugar sticks to teeth.
c. they are low in calcium.

This is an important concept to test because of the correlation between snacking on sweets and tooth decay.

More than three-fourths of the fourth graders are aware that sticky, sugar-containing sweets help promote tooth decay.

In this question, as in questions 124 and 132, knowing the correct meaning of the term "calorie" would be helpful. According to the review panel, although emphasis on calories is usually reserved for upper grades, knowledge about calories is not too difficult a concept for fourth graders.

#134 OBJECTIVE 1

Cavities are affected by which factor or factors?

a. The amount of sugar eaten
b. The stickiness of the sugar-containing food
c. The amount of time you brush your teeth
33% d. All of the above.

The results would indicate that students may not be aware of the factors, besides sugar, that affect dental health.

#135 OBJECTIVE 2

A good guide for us to use in choosing foods for a well-balanced diet is

64% a. the basic four.
b. our appetites.
c. our friend's choices.

Almost two-thirds of the fourth graders knew that the basic four food groups is a good guide to use in choosing foods for a well-balanced diet.

#136 OBJECTIVE 2

A meal consists of milk, bread and butter, meat and cake. To satisfy the rules of good nutrition, what should be added to this meal?

59% a. A green or yellow vegetable.
b. Baked beans
c. Cheese
d. Coffee or tea
e. Pickles and olives

This question indicates that more than one-half of the fourth graders are able to apply practical knowledge of the four food groups. Panel members feel that students need to recognize the concept that including a food from each food group at a meal promotes good nutrition. In order to answer the question correctly, students indicated a knowledge of the four food groups and the ability to categorize foods into each.

#137 OBJECTIVES 1, 2, 3

For boys and girls to grow properly, they must

a. eat the proper foods.
b. get the proper amount of sleep.
c. exercise.
48% d. do all of the above.

This question tests three of the nutrition objectives. The results indicate that almost one-half of the fourth graders know that a combination of proper foods, proper amount of sleep, and exercise contribute to optimal growth, rather than any one of these by itself.

#138 OBJECTIVE 2

Which food has lots of calcium?

31%	a.	Cheese
	b.	Eggs
	c.	Bananas
	d.	Butter

The variance that occured among the responses indicate fourth graders may not be familiar with specific nutrients and their sources. According to the review panel, this is usually not included in the curriculum until the upper grades. However, since the term calcium may be familiar to fourth grade students, it could be assumed that they knew the milk group is high in calcium. If this is the case, they would have been able to select the correct response.

Eighth and Eleventh Grade Item Analyses

The following questions are concerned with student attitudes towards nutrition. The numbers to the left of the choices represent the percentage of eighth graders who chose the correct answer, and the ones on the right indicate the percentage of the eleventh graders.

#128 #134

Foods that are supposed to be good for you taste

8th			11th
7.3%	a.	better than other food.	7.3%
46.6%	b.	not as good as other food.	35.8%
45.7%	c.	about the same as other food.	56.6%

There appears to be an increase in acceptance of the idea that foods that taste good and foods that are supposed to be good for you taste about the same. Panelists feel that the larger percentage in the eleventh grade is a positive result.

#129 #135

My attitudes concerning nutrition have been formed mostly through

8th			11th
50.8%	a.	my home (my parents and family).	51.5%
7.8%	b.	my friends and others my own age.	4.4%
12.0%	c.	school.	11.8%
4.8%	d.	TV and other media.	4.6%
23.7%	e.	my own thinking (independent of others).	27.2%

Student responses may show educators where nutrition education could be directed most effectively. Responses seem to indicate that food choices are still determined primarily by the home and family environment.

#130 #136

Information about nutrition

8th			11th
3.9%	a.	should be studied less in the schools.	2.4%
49.9%	b.	should be studied more in the schools.	49.0%
37.4%	c.	is studied enough in the schools.	41.6%
8.4%	d.	is not important enough to be included as a special part of the school curriculum.	6.6%

The results indicate that almost half of the students feel that they should have more instruction on nutrition in school. Approximately one-third of the students in grade levels eight and eleven feel that their nutrition instruction is adequate.

#131 OBJECTIVES 1, 2 #137

What does good nutrition mean?

8th			11th
2.2%	a.	Eating enough food to keep from being hungry.	1.5%
88.5%	b.	Eating the right amount of food from each of the four food groups.	94.9%
3.1%	c.	Eating all the food that your mother serves to you.	1.2%
5.6%	d.	Eating lots of vegetables.	1.9%

The following questions have a designated correct response which is underlined. In addition to the percentage of students responding to each choice and reviewer's comments, the objective which is assessed by the question is indicated.

#132 OBJECTIVE 5 #138

Which one has fewer calories?

8th			11th
91%	a.	Skim milk	96%
	b.	Whole milk	
	c.	Chocolate milk	

A general knowledge of the word "calories" is needed to respond to the question. Students appear to recognize the caloric value of several kinds of milk. The question might be improved by adding other choices such as buttermilk or 2% milk.

#133 OBJECTIVE 3 #139

The most important mineral for building strong teeth and bones is

8th			11th
	a.	iron.	
81%	b.	calcium.	93%
	c.	iodine.	
	d.	magnesium.	

This is an important question at the eighth grade level, as students are growing and developing rapidly at this age - especially girls. The information is appropriate for eleventh graders because they are still growing and because of the increased need for calcium in the case of teenage pregnancies.

The high correct response rate indicates some knowledge of the function of calcium. The 12% difference in correct answers from eighth to eleventh grade students tested indicates a better understanding of this concept.

#134 OBJECTIVE 4 #140

Fruits and vegetables should be as fresh as possible when they are preserved so that

8th			11th
	a.	more vitamins and minerals will be preserved.	
	b.	the texture will be more pleasant	
	c.	the flavor will be more pleasant	
68%	d.	all of the above.	84%

Students appear to have some knowledge about proper food handling. Vitamin and mineral preservation/retention may be included within the school curriculum.

#135 OBJECTIVES 2, 3 #141

Foods from the breads and cereals group have lots of

8th			11th
51%	a.	carbohydrates.	72%
	b.	fat.	
	c.	protein.	

Responses to this item indicate that students have some knowledge of the nutrient contributions of the bread and cereal group.

The larger percent of correct answers at the eleventh grade tends to indicate that there is less confusion about sources of fats, carbohydrates, and protein with older students.

#136 OBJECTIVE 2 #142

Eggs, an excellent source of protein, belong in

8th			11th
46%	b.	the meat group.	51%
	a.	the milk group.	
	c.	their own special group.	

In general, the students show some level of ability in classifying foods into the four food groups.

Students appear not to recognize that foods are classified into food groups according to their nutrient contribution. Even with the clue "excellent source of protein," about half the students missed the question.

Panelists suggest that confusion may have resulted from eggs being placed in the dairy case in supermarkets.

#137 OBJECTIVES 5, 6 #143

Individuals are more likely to be overweight if

8th			11th
	a.	they have parents who are overweight.	
	b.	they eat more calories than they use in activity.	
	c.	they were overweight when they were a child.	
41%	d.	all of the above.	57%

Students appear to understand the concept of energy and activity balance in weight control.

Reviewers believe that this is a good question to test the concept that many factors are involved in weight control. Panelists suggest that results for eleventh grade students tend to show more awareness and a better understanding that other factors are important in weight control.

#138 OBJECTIVE 2 #144

Foods classified in the meat group are meats and

8th			11th
	a.	poultry and fish.	
	b.	eggs, dry beans and peanut butter.	
36%	c.	both a and b.	41%

Students in the eighth grade are not aware of all the products that go into the meat group. While there is some slight improvement at the eleventh grade, over one-half of the eleventh grade selected only animal protein, showing a similar lack of knowledge about incomplete proteins.

Review panelists suggest that the results indicate that the awareness of foods that are placed in the "meat group" is too narrow. A shrinking world food supply relative to a growing world population may necessitate having a greater knowledge of alternate sources of protein. Students may know that dry beans, etc., go in the meat group, but may be confused because they have been taught the "meat, fish, poultry" group name.

#139 OBJECTIVE 3 #145

Which nutrient would be needed to harden bones?

8th		11th
	a. Protein	
74%	b. Calcium	85%
	c. Vitamin C	
	d. Fat	

Responses seem to show that generally these students understand the relationship between calcium and the hardening of bones. The external reviewers think that this is a relevant question at the eighth grade level due to an accelerated growth rate at this age. They also think that knowing the function of calcium is important for 11th graders as they are still growing and females are of childbearing age.

#140 OBJECTIVE 3 #146

Choose the dinner menu which contains food from each of the four basic food groups.

8th		11th
	a. Baked fish, buttered corn, lettuce salad peaches, milk	
27%	b. Hamburger-cheese pizza, tossed salad, peaches, milk	32%
	c. Macaroni and cheese, whole wheat bread, jello, milk	

Panelists suggest that the fact that so few students (27% at the eighth grade, and 32% in the eleventh grade) chose the correct answer, which included pizza, may indicate students have been told any fast-food item or "typically teen" food is not good for them or would not fit into the four food groups. The number of incorrect answers may indicate a lack of understanding of combination foods and how they are evaluated using the four food group system. Students appear to have difficulty analyzing combination foods and how they fit into the four groups.

#141 OBJECTIVE 3 #147

Which nutrient supplies energy?

8th			11th
	a.	Vitamin D	
35%	b.	Carbohydrates	50%
	c.	Water	
	d.	Iron	

A general knowledge of the function of nutrients is lacking, specifically food sources of energy.

#142 OBJECTIVES 2, 3 #148

This nutrient may be lacking if you are tired most of the time. It is especially important for girls to include in their diets.

8th			11th
	a.	Vitamin A	
	b.	Fat	
60%	c.	Iron	83%

Panelists suggest that "Especially important for girls" is an important clue to the correct answer - iron. The term "female" would be a more appropriate label than "girl." This is a relevant question because of the students' physical level of development.

Lack of nutrient knowledge is indicated again, especially at the eighth grade level. Most eleventh grade students knew the answer. There was a twenty-three percentage increase in student performance between the eighth and eleventh grade scores.

#143 OBJECTIVES 2, 3 #149

Fruits and vegetables are important because

8th			11th
	a.	they are our best source of the B vitamins.	
65%	b.	they are a source of essential vitamins and minerals.	77%
	c.	they are an excellent protein source.	

The percentage of correct responses reflects some knowledge of the nutrient contribution of one of the food groups.

This question was tested at all three grade levels, and there is a steady increase in the percentage of correct answers from the fourth (40%) to the eleventh grades. Eleventh grade students, in particular, exhibited a good knowledge of the nutrient contribution of fruits and vegetables.

#144		OBJECTIVE 2	#150
		Calcium helps to have strong bones and teeth. What group of foods give you the most calcium?	
8th			11th
	a.	Meat	
76%	b.	Milk	90%
	c.	Fruits and vegetables	
	d.	Breads	

Student results indicate a knowledge of where calcium is found in the diet.

This question identified a leader nutrient of a particular food group. Student responses indicate knowledge of the source of calcium - the milk group.

#145		OBJECTIVE 4	#151
		Foods which are easily contaminated by bacteria causing food poisoning and which require careful handling are	
8th			11th
	a.	mayonnaise.	
	b.	cracked, uncooked eggs.	
	c.	ham, chicken and tuna.	
51%	d.	all of the above.	69%

The review panel thinks that this is an important concept to test because food poisoning is a completely avoidable problem. At the eleventh grade level, this may be of greater importance because of the likelihood of their increased participation in food preparation.

#146		OBJECTIVE 3	#152
		Why should you eat different kinds of food every day?	
8th			11th
	a.	To get skinny.	
89%	b.	To get the nutrients you need.	93%
	c.	We are all different people.	
	d.	They taste better.	

#147		OBJECTIVE 2	#153
		For dinner Jane had -- beef roast, mashed potatoes, peach salad, and a hot roll. To get a balanced dinner, she should add	
8th			11th
	a.	hamburger.	
95%	b.	milk.	97%
	c.	coffee.	

The results indicate that students understand the need for a food from the milk group to create a balanced diet. Students needed a basic understanding of the four food groups to complete the questions correctly.

The addition of an answer choice such as fruit juices or vegetable might provide a better indication of knowledge. Because of the answer choices available, the question may be too easy for these grade levels.

#148 OBJECTIVE 3 #154

Check the example of an incomplete protein.

8th			11th
80%	a.	Dried beans	84%
	b.	Meat	
	c.	Fish	

The review panel believes that the concept of complete and incomplete protein sources is important. They think that it is significant that such a high percentage answered correctly. However, answer choices such as green beans, milk or cheese might have required more discrimination. The results may indicate that some students associate plant source foods with incomplete protein.

#149 OBJECTIVE 4 #155

To keep vitamins and minerals from being destroyed in the food we prepare, we should

8th			11th
	a.	soak vegetables in water before cooking.	
83%	b.	keep fresh vegetables covered in the refrigerator until ready to prepare.	89%
	c.	cook them for a long time.	

Students indicate knowledge of food preparation concepts. External reviewers feel that this is particularly important with an increased emphasis on gardening and the consumption of fresh fruits and vegetables.

Panelists suggest that this is a good question for eighth graders because more junior high students are taking responsibility for meal preparation due to more working mothers and working older teens.

#150 OBJECTIVE 6 #156

Foods are broken down by digestion into the body needs. The major nutrients are

8th			11th
	a.	protein.	
	b.	vitamins and minerals.	
	c.	carbohydrates and fats.	
64%	d.	all of the above.	79%

In this question, students are identifying the different kinds of nutrients. Panelists suggest that an increase in the percentage of correct responses from the eighth to eleventh grade indicates older students may be more aware of the importance of all nutrients.

#151	OBJECTIVE 3	#157
	It is easier for your stomach to digest food when	
8th		11th
	a. you are upset.	
	b. you eat fast.	
94%	c. you eat slowly.	96%

Responses show some understanding of the process of digestion.

#152	OBJECTIVE 2	#158
	Joe is having a party Saturday. What would you select for refreshments that would contribute to the guests' nutritive needs?	
8th		11th
84%	a. Cheese, crackers, peanuts and fruit punch	92%
	b. Cola drinks, potato chips, and gumdrops	
	c. Uncola drinks, pretzels, and chocolate fudge	
	d. Cracker jacks, corn chips and kool-aid	

The results show that students were able to recognize the more nutritious snacks. External reviewers suggest that this is an especially important question because young teens snack frequently.

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